

REMARKS

In response to the office action mailed March 21, 2005, applicants certainly appreciate the indication of allowance of claims 31-36 if amended to overcome the objections set forth in the office action. Applicants have amended these claims as well as claims 6 and 21 to overcome objections under 35 USC 112. Applicants have also added new claims 37-41. A check of \$325 (small entity) for the five additional claims and two additional independent claims is enclosed. If any additional fees are due, please charge them to Bracewell & Giuliani Deposit Account No. 50-0259. Applicants are also enclosing a supplemental information disclosure statement.

In regard to the objection of the specification, applicants are amending the specification in a number of places to include numerals for the pontoons, threaded engagement element, threaded bottom hole assembly elements and blowout preventer hanger. In the preferred embodiment, the pivotal engagement element comprises links 62 and elevator 64, which are already numbered and shown in the drawings, such as in Figure 5. Additionally, the telescoping lubricator is already designated by the numeral 58 in Figures 1 and 5. Applicants are enclosing copies of a number of the drawings and requesting approval to correct the drawings as indicated.

Additionally, applicants are requesting approval to add new Figures 13 and 14 to further illustrate the operation of links 62 and elevator 64 when making up a bottom hole assembly (BHA). These Figures illustrate the components schematically and do not add any new matter. The specification is amended to discuss the new drawings, but contains no new matter.

This patent application discloses a drilling rig that will drill with jointed drill pipe as well as perform coiled tubing operations. Referring to Figures 1, 5 and 6, coiled tubing injector 48 moves on a dolly 42 between an out-of-line position shown in Figures 1 and 5 and an in-line

position with mast 34 shown in Figure 6. A top drive 60, shown also in Figures 1, 5 and 6, moves longitudinally up and down mast 34 independently of coiled tubing injector dolly 42. Top drive 60 has a pivotal engagement member comprising links 62 and an elevator 64 (Figure 5) for picking up jointed pipe 65 (Figure 5) and also for assembling a bottom hole assembly 59 (Figures 13 and 14). The rig has a rotary table 38 (Figure 1) at the rig floor that has slips 33 (Figures 13 and 14) to support jointed pipe as well as the BHA 59.

For conventional drilling, coiled tubing injector 48 is moved to the second position, out of alignment with mast 34. With links 62 and elevators 64, top drive 60 picks up separate elements of jointed pipe 65 (Figure 5), lowers them through rotary table 38 and performs drilling operations by rotating top drive 60. For coiled tubing operations, top drive 60 along with links 62 and elevators 64 makes up BHA 59 (Figures 13 and 14) by picking up an element 59a, supporting it with slips 33 in rotary table 32, then picking up another element 59b. As shown in Figure 14, once element 59b is supported on element 59a, top drive 60 may be lowered relative to second element 59b until top drive threaded engagement member 61 engages the upper end of upper element 59b. The operator can rotate either the rotary table 32 or threaded engagement member 61 to secure BHA element 59b to BHA element 59a.

After BHA 59 is made up and supported by slips 33, coiled tubing 54 is then lowered into engagement with the top of second BHA element 59b, then rotary table 32 is rotated to secure coiled tubing 54 to BHA 59. Because most of coiled tubing 54 will still be on spool 76 during the make-up with BHA 59, it can not be rotated about its axis.

Claims 1-15 and 17-29 were rejected under 35 USC 103(a) over Wilderman and Andreychuk '598 patent. The Wilderman patent does not show a drilling rig that is capable of

coiled tubing operations. Rather, Wilderman discloses a drilling rig that handles only jointed pipe. The drilling rig has a pipe handling arm 30 that will lift the individual pipe elements into alignment with the mast. As shown in Figure 5, the unit has a power swivel 36 that rotates to make up with each new element of drill pipe. Slips 54 are also shown in Figure 5, but there is no rotary table. Rather, makeup of the separate elements of the drill string is handled by power tongs 56, which are located above slips 54, and the threaded engagement member 42 of power swivel 36. Wilderman does not mention coiled tubing operations.

Andreychuk '598 discloses a drill rig with a coiled tubing injector 70 that is raised and lowered by a winch 46 at the top of the derrick, as shown in Figure 2. As indicated in Figure 5 by the dotted lines, coiled tubing injector 70 can be moved out of alignment with the mast. Column 6, lines 60-65 states that moving the injector out of plane of the derrick frees the derrick for running conventional jointed pipe. However, the patent does not disclose how the jointed pipe is handled, or how to make up a BHA. Andreychuk '598 does not mention a top drive.

Claim 1 requires a coiled tubing injector mounted on the mast such that the coiled tubing injector may be selectively transposed between a first position, in which the injector is in-line with the mast, and a second position in which the injector is out-of-line with the mast. Claim 1 also requires a top drive slidable along the mast. As mentioned, there is no suggestion of mounting a coiled tubing injector to the mast of Wilderman, as required by the claim.

Applicants submit that it would not be obvious to one of ordinary skill in the art to arrange the rig of Wilderman to have a coiled tubing injector as taught by Andreychuk. Referring to Figure 4A, power swivel 36 of Wilderman is supported on a series of cables 154 and pulleys or sheaves for moving power swivel 36 up and down the mast. Cables 154 and sheaves

also will provide a pull-down force to power swivel 36. Referring to Figure 2 of Andreychuk '598, coiled tubing injector 70 is mounted on a cradle that is suspended from a winch 46. One could visualize how injector 70 could be used in place of power swivel 36, but it would require the removal of power swivel 36 of Wilderman. Because both are suspended by cables and pulleys, there is no room for both injector 70 and power swivel 36 to be mounted to the derrick of Wilderman at the same time. The cables, pulleys and winches would interfere with one another. Trying to make coiled tubing injector 70 movable from an out of line position to an in line position would not work because power swivel 36 would block injector 70 from moving in line. Claim 1 requires a top drive slidably mounted on the mast and a coiled tubing injector mounted on the mast. The claim requires both of these units being mounted on the mast, and there is no suggestion how both units could be mounted on the mast of Wilderman. Applicants therefore submit that claim 1 is unobvious to one of average skill in the art.

In addition, Applicant submits that it would not be obvious to arrange for the pipe handling arm 30 of Wilderman to be a coil tubing injector, as taught by Andreychuk. The pipe handling arm picks up joints of pipe, moving from a horizontal to a vertical position. If the pipe handling arm were simply replaced with a coiled tubing injector, the coiled tubing injector could not function since it would be tilted from a horizontal to a vertical position in accordance with the pipe handling arm mechanism of Wilderman. This movement of the coiled tubing injector would not be possible with coiled tubing. Further, replacing the pipe handling arm with a coiled tubing injector would render the Wilderman rig useless for jointed pipe drilling. There would be no mechanism for positioning the joints of pipe in vertical alignment with the power swivel. There would be no mechanism for removing the joints of pipe as the string of pipe is pulled from the well.

Claim 2 depends from claim 1 requiring a rotary table operable to engage and rotate downhole equipment, mounted on the base and aligned with the mast. Neither reference discloses a rotary table. Wilderman discloses slips 54 in Figure 5, but the slips do not rotate. Rather all rotation is handled by power swivel 36 and power tongs 56. Andreychuk '598 does not disclose a rotary table, either. By having a rotary table, applicants are able to more efficiently make up a BHA with the lower end of a length of coiled tubing. Note that the lower end of the coiled tubing cannot rotate about the axis of the derrick, therefore the rotary table can rotate the BHA suspended within it in order to make up the connection between the BHA and the coiled tubing.

Claims 3 and 18 require that the coiled tubing injector be in a fixed position along the length of the mast. Although the claim does not use the word "axial", it is clear that fixed position means axial. The coiled tubing injector as shown in the specification is movable in and out of line with the mast as can be seen by comparing Figures 5 and 6. Therefore, this claim can only mean that it is axially fixed along the length of the mast. In Andreychuk '598, coiled tubing injector 70 moves along mast by way of winch 46, therefore does not suggest this invention. Making the coiled tubing injector fixed along the length of the mast simplifies the rig and reduces cost.

Claims 6 and 21 require that the top drive have a threaded engagement member, which is shown by the numeral 61 in Figure 13, and a pivotal engagement member, which comprises links 62 and elevators 64 of Figure 13. The claim requires that the pivotal engagement element (62, 64) is adapted to allow downhole equipment (59b) to pass through it to engage the threaded engagement element (61) when the downhole equipment (59b) is in-line with the mast. Wilderman's power swivel 36 does not have a pivotal engagement member mounted to it.

Instead, pipe handler 30 (Figure 1) moves a section of pipe into alignment with power swivel 36 as explained at column 3, lines 17-23. Pipe handling arm 30 holds it in an upright position to enable power swivel 36 to screw into the upper end of the pipe. There would be no need to attach a pivotal engagement element to power swivel 36 to pick up pipe, as illustrated in Figures 13 and 14 of this application, because this is handled by pipe handling arm in Wilderman.

Claim 17 requires a top drive and a coiled tubing injector, both mounted on the mast. This claim also requires a rotary table. As previously discussed, it would not be obvious to modify Wilderman to also include a coiled tubing injector such as injector 70, because coiled tubing injector 70 requires a winch 46 and power swivel 36 also requires a winch assembly and cables. Without extensive re-design, one could not mount both the injector and the power swivel on the mast of Wilderman. Rather only one could be mounted on the mast at one time, thus not meeting the requirements of claim 17.

Claims 16 and 30 were rejected over Wilderman and Andreychuk '598 further in view of Smith. Applicants submit that these claims are allowable because they depend from base claims that are allowable. However, applicants will point out that Smith deals with a snubber assembly. A snubber assembly does not have a mast like a drilling rig. Hydraulic cylinders 20 are mounted between traveling slips 12 and stationary slips 13 as shown in Figure 2. Traveling slips 12 will grip the pipe as hydraulic cylinders 20 move the traveling slips downward or upward relative to the stationary slips. Traveling slips 12 are not mounted to a mast for movement along a length of the mast. A snubber can be used to push pipe into a well under pressure by gripping the pipe and pushing it downward, and it can also be used to pull a string of pipe from a well under pressure. Stationary slips 13 support the pipe when an element of the pipe string is being secured or removed from the portion within the well.

Smith can also be used for injecting coiled tubing, but it teaches an injector head 29 with two halves 30, 31 (Fig. 4) that can move to a position in line and out of line with the well. Injector head 29 is located below rotary table 15 on a vertically movable platform, not on a mast. Smith teaches that the snubber can be used for drilling with jointed pipe using the rotary table to rotate the pipe (Col. 3, line 6). Smith does not suggest that drilling could be accomplished with coiled tubing, which does not rotate. In order to drill with coiled tubing, a bottom hole assembly with a downhole drill motor must be employed. Smith does not suggest such a bottom hole assembly, rather teaches away from drilling with coiled tubing. At column 3, lines 35-45, Smith discusses a number of disadvantages of drilling with a coiled tubing rig. At lines 51-61, Smith compares the disadvantages of drilling with a coiled tubing rig with that of a hydraulic workover rig, which is a rig with a mast, unlike a snubber. At column 3, line 65, Smith criticizes prior attempts to combine a coiled tubing operation with a hydraulic workover rig by moving the coiled tubing injector head off the well centerline for jointed drill pipe operations. He suggests instead to utilize a snubber unit rather than a rig with a mast. Because of the extensive differences between the snubber of Smith and the drill rig of Wilderman, which has a mast, applicants submit that the combination would not be obvious.

Claims 1 and 16 were also rejected over Andreychuk '150, a published application. Andreychuk '150 discloses a rig for jointed pipe drilling as well as coiled tubing injection operations. As shown in Figure 1b, a set of traveling blocks 48 moves a trolley 60 up and down a mast. Trolley 60 will alternately support a top drive 80, shown in Figure 4b or a coiled tubing injector 50 (Figure 1b). Both the top drive 80 and injector 50 can be moved along the rail 66 of trolley 60 in and out of alignment of the derrick. However, only one can be present at the same

time on the unit. Trolley 60 has room for only either the top drive 80 or the coiled tubing injector 50. Paragraph 60 mentions that the injector is removed from the trolley when not needed. Paragraph 71 discusses switching from the injector operation to the top drive operation, and it discusses removing the top drive from the trolley for an injection operation. Paragraph 72 mentions that one can switch between top drive and jointed pipe operations without removing the top drive off the mast. It states that the top drive can be taken out of the plane of the mast by lowering the trolley toward the mast's bottom end and rolling it along rails 60 (paragraph 72). The traveling block 48 may be disengaged from trolley 60 and may operate without the top drive as shown in Figures 7a and 7b. However, it does not suggest switching between a top drive operation and a coiled tubing injection operation; rather it teaches that the top drive must be completely taken off trolley 60 in order to switch to the coiled tubing injector 50.

Claim 1 requires a top drive operable to engage and rotate downhole equipment, slidably mounted on the mast. It also requires a coiled tubing injector mounted on the mast such that the coiled tubing injector may be selectively transposed between a first position, in which the injector is in-line with the mast, to a second position in which the injector is out-of-line with the mast to accommodate manipulation of downhole equipment by the top drive. Claim 1 thus requires that the top drive be capable of operation while the coiled tubing injector is shifted to the second position on the mast. This cannot occur in Andreychuk '150 because the top drive has to be entirely removed from the derrick before the coiled tubing injector can be installed on the derrick. Claim 1 requires the top drive and the coiled tubing injector be both mounted on the mast at the same time, and that is not shown in Andreychuk '150. Claim 16 depends from claim 1, thus should also be allowed.

New claim 37 requires a top drive that remains in-line with the mast above the coiled tubing injector while the coiled tubing injector is in the first position in-line with the mast. This requirement is not suggested by Andreychuk '150 or any of the other references. No reference suggests an arrangement wherein a top drive is located in-line with the mast while a coiled tubing injector is also in-line with the mast.

Claim 37 also requires a rotary table on the base in-line with the mast and below the coiled tubing injector platform. The references do not show the combination of a top drive, a rotary table and a coiled tubing injector. Wilderman does not show a rotary table. The two Andreychuk references do not disclose a rotary table. Rotary table 15 of the snubber shown in Smith is not located on the base, rather it is mounted on the upper end of the assembly. New claim 38 requires a pivotal engagement member mounted to the top drive, and this is not shown in the references.

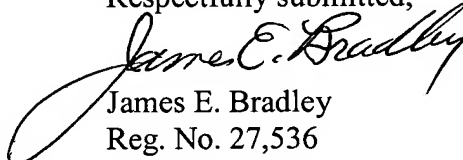
Claim 39 is a method claim that requires for jointed pipe drilling, moving the coiled tubing injector to a position on the coiled tubing injector platform out-of-line of the mast, securing a threaded engagement member of the top drive to a string of jointed drill pipe, and lowering the drill pipe through the rotary table into the well. This is not suggested in any of the references. Andreychuk '150 requires for top drive operations to move the coiled tubing injector completely off of the platform and replace it with a top drive unit. Andreychuk '598 does not disclose a top drive. Claim 39 also requires for coiled tubing operations, supporting a bottom hole assembly in the well with slips of the rotary table, moving the coiled tubing injector to a position on the coiled tubing injector platform in-line with the mast, moving a threaded end of the coiled tubing with the coiled tubing injector into engagement with a threaded upper end of the bottom hole assembly, and rotating the bottom hole assembly with the rotary table to make

up the bottom hole assembly with the coiled tubing. The references do not suggest this step. Andreychuk '150 does not disclose a rotary table, nor does Andreychuk '598.

Claim 40 further requires making up separate elements of the bottom hole assembly by engaging a first element of the bottom hole assembly with a pivotal engagement member mounted to the top drive, then lowering the first element into the rotary table and supporting it with slips. It requires engaging a second element of the bottom hole assembly with the pivotal engagement member and lowering the second element into engagement with the first element. These steps are not shown or suggested in the references.

It is respectfully submitted that the claims are now in condition for allowance and favorable action is respectfully requested.

Respectfully submitted,


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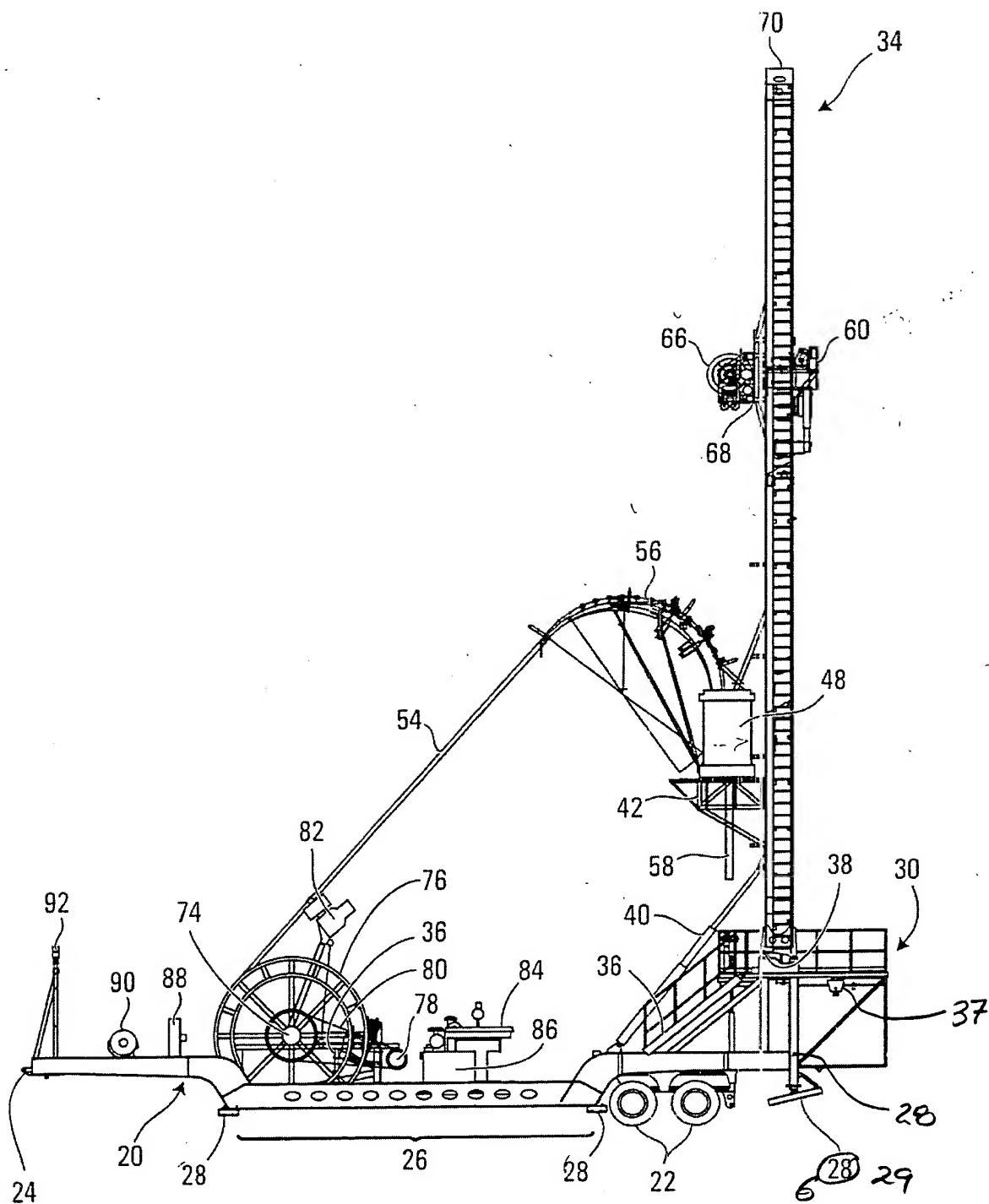


FIG. 1

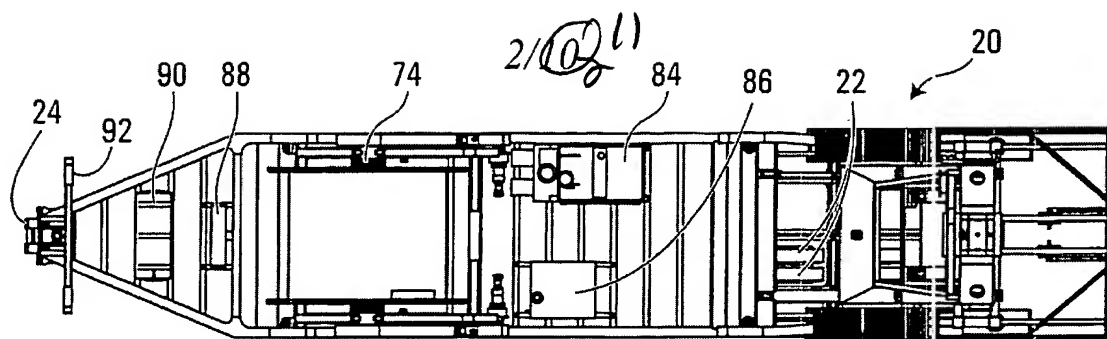


FIG. 2

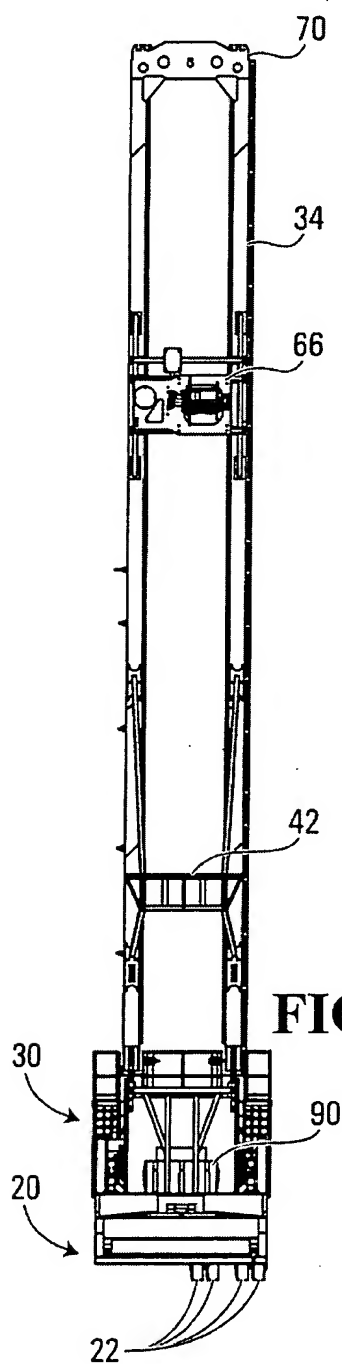


FIG. 3

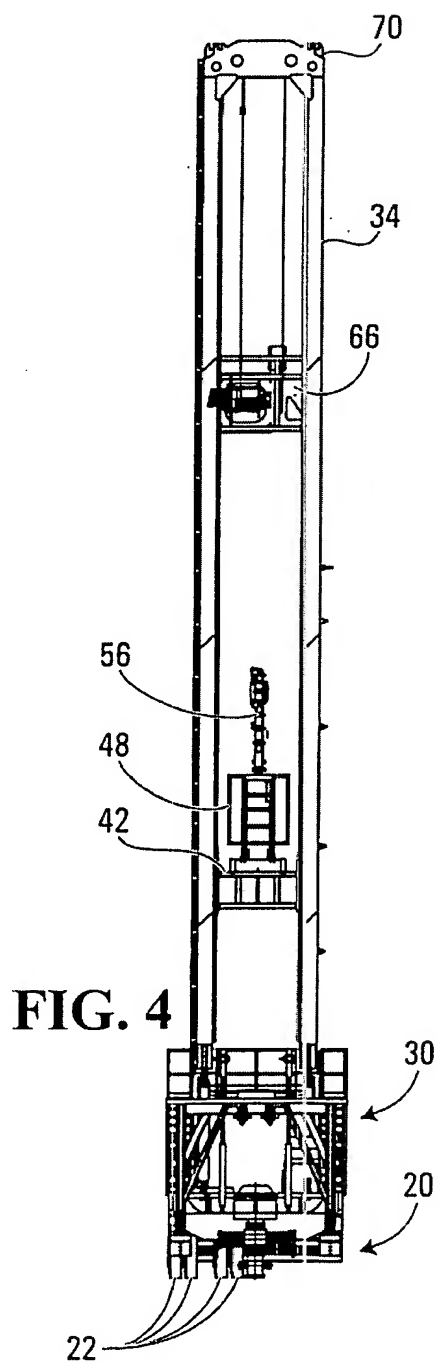


FIG. 4

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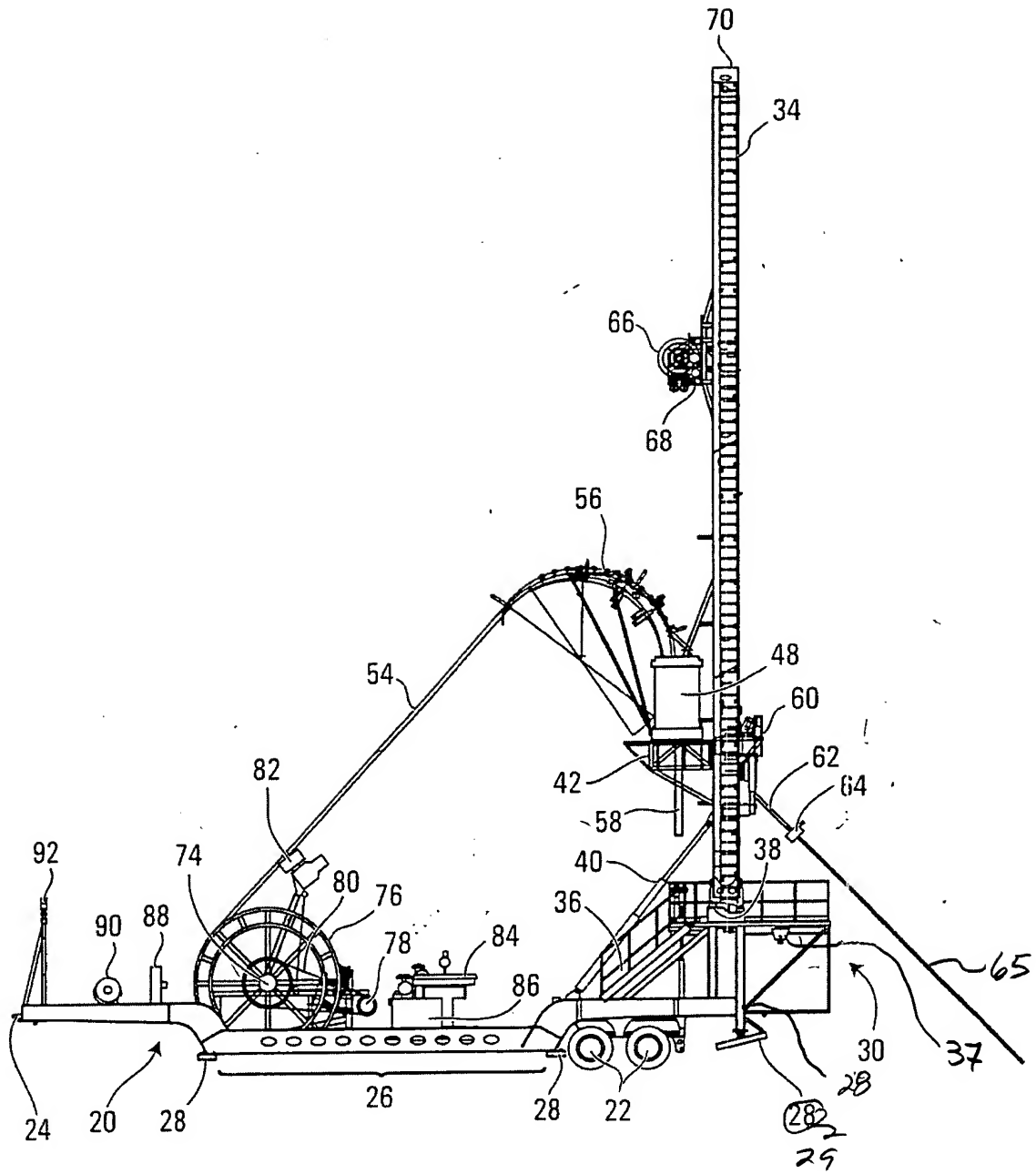


FIG. 5

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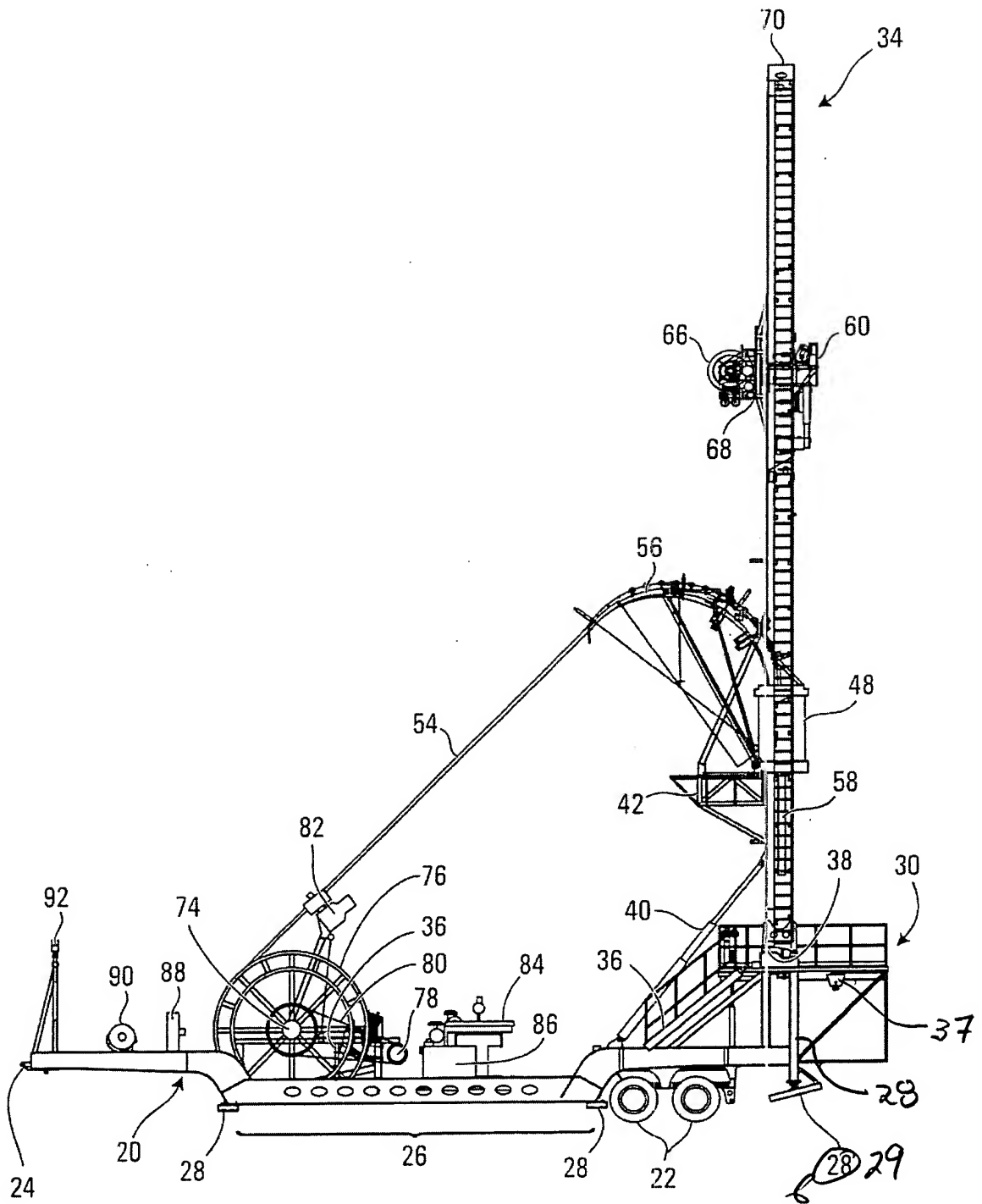


FIG. 6

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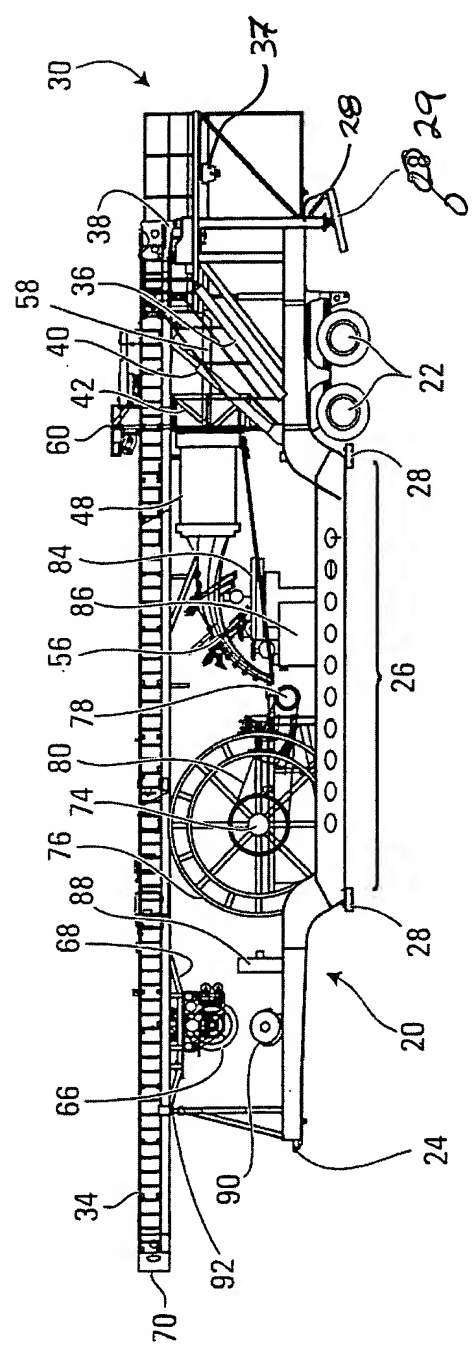


FIG. 7

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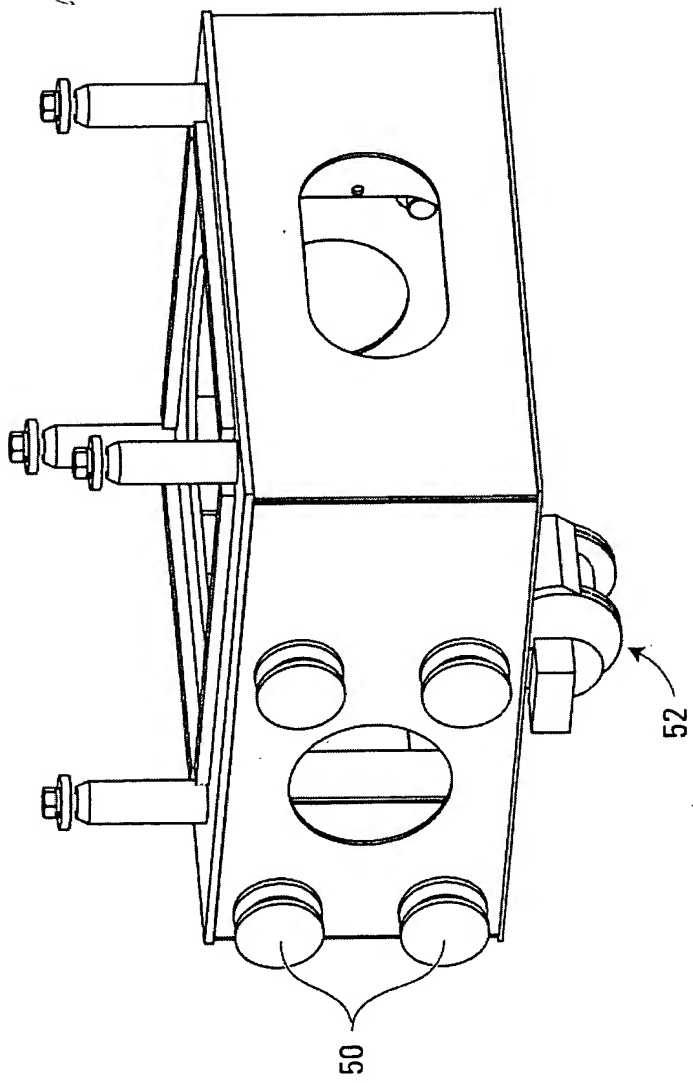


FIG. 8

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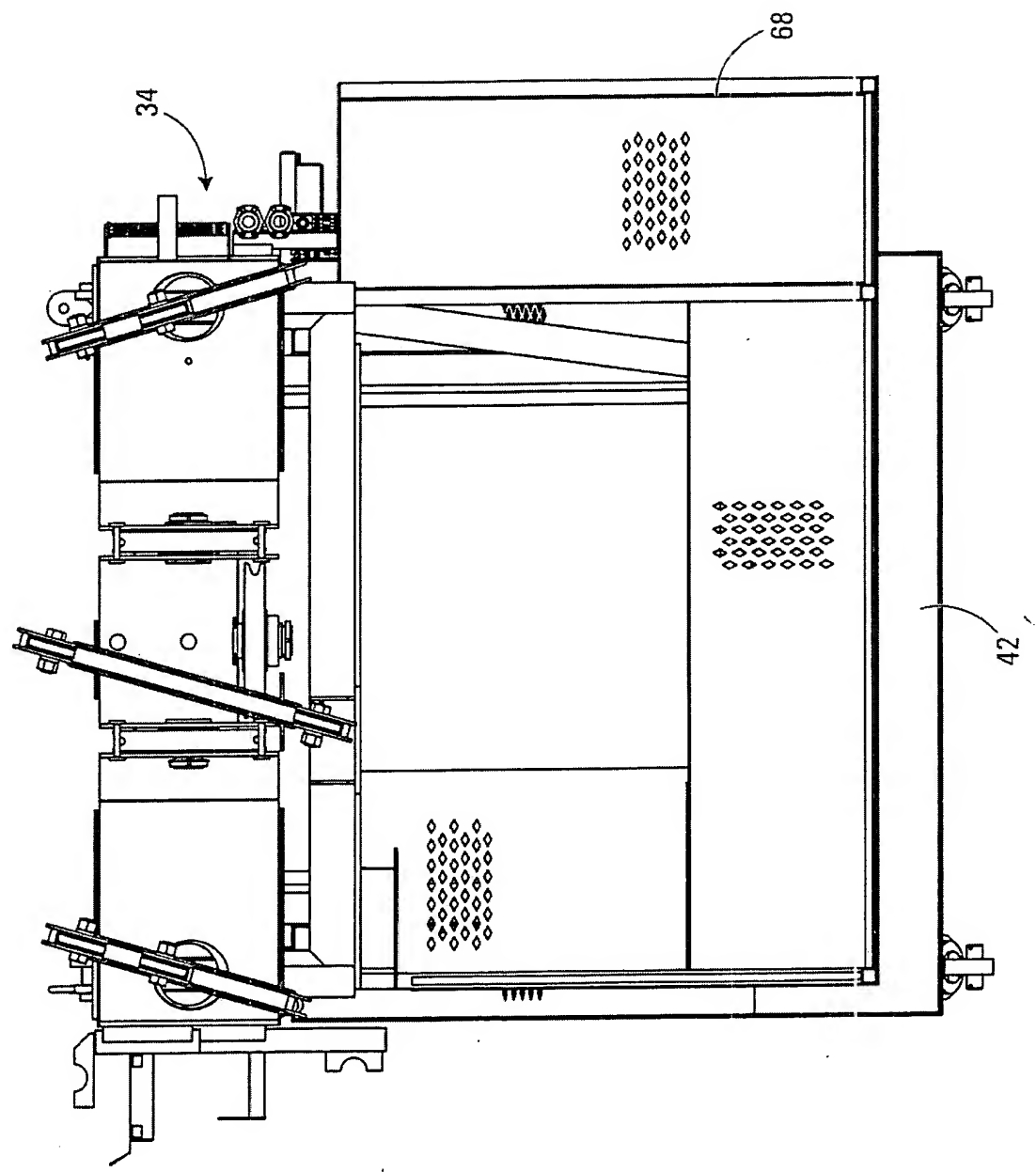


FIG. 9

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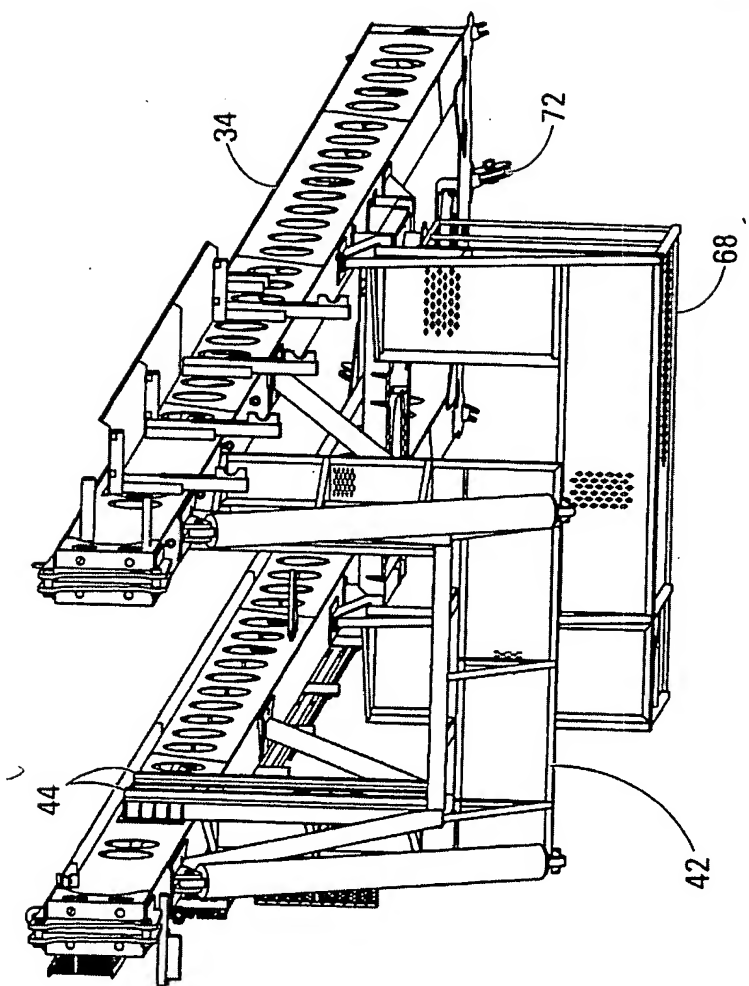


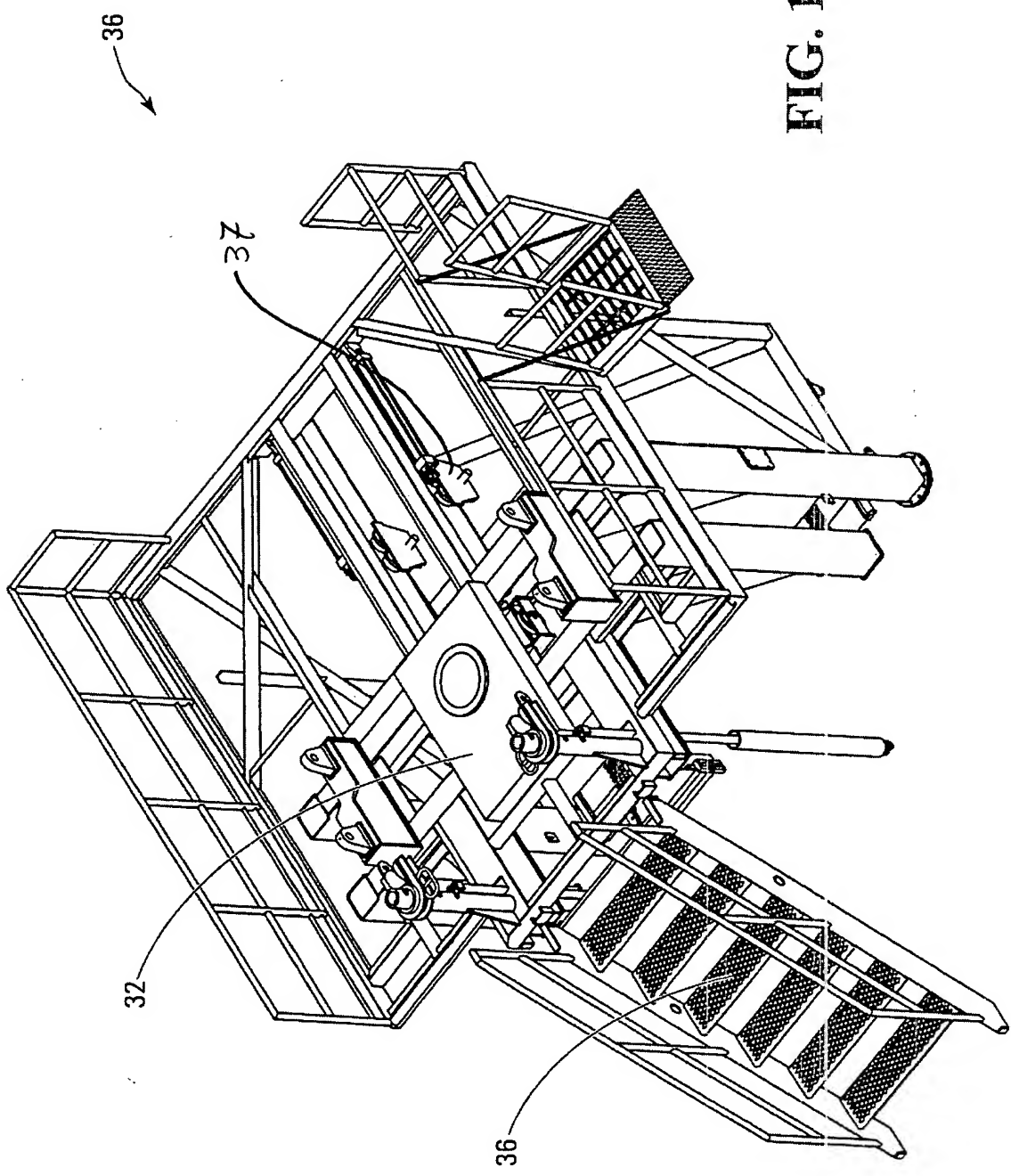
FIG. 10

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FIG. 11



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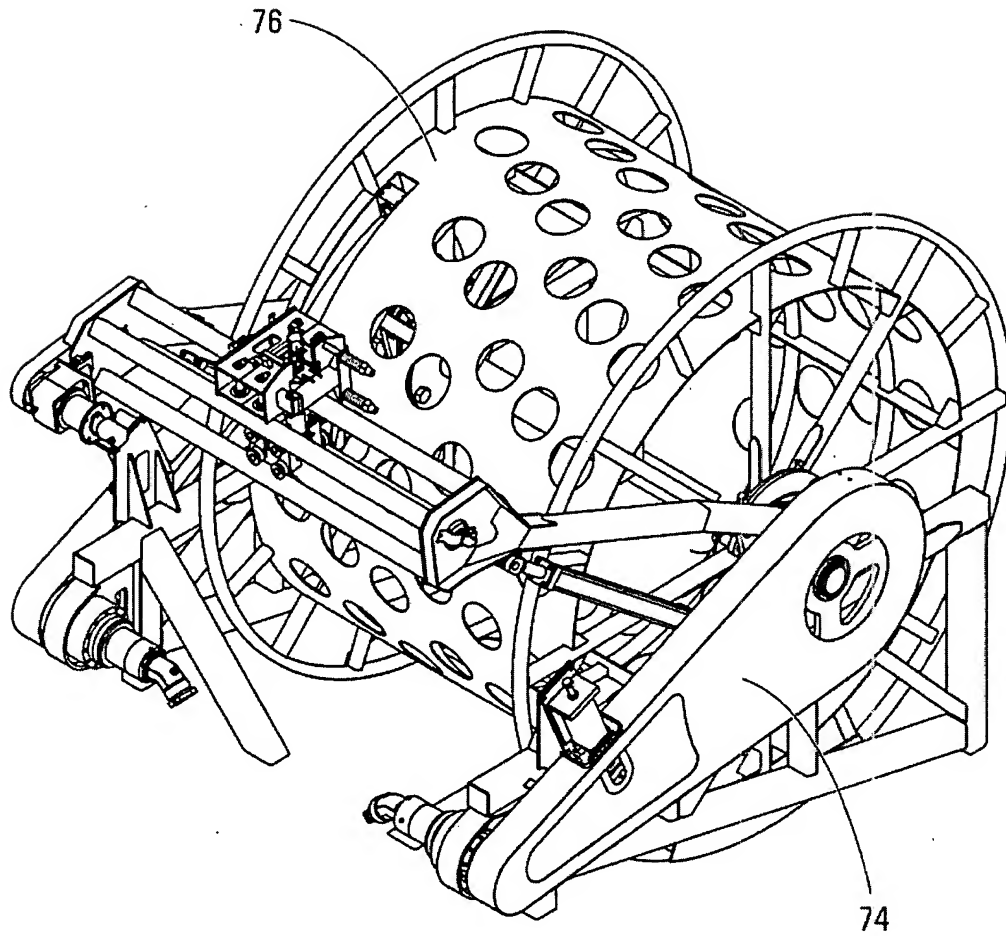


FIG. 12